

Serial No. 10/661,688
Atty. Doc. No. 2003P12262US

REMARKS

Applicants have amended claims 1, 8 9, 11, and 16. Thus, claims 1-16 are pending in the application and presented for examination. Applicants respectfully request allowance of the present application in view of the foregoing amendments and the following remarks.

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Response To Rejections Under Section 102:

Claims 1, 7, and 8 stand rejected under 35 U.S.C. § 102(b), the Examiner contending that these claims are anticipated by U.S. Patent No. 6,196,799 to Fukue ("Fukue"). The Examiner apparently reads Fukue as disclosing the claimed invention in Figure 5(a), 5(b), and
10 6. The Applicant respectfully disagrees, in light of the present amendments and request the Examiner to reconsider such characterization.

As shown in the Figures referenced above, the Fukue device is cooled gas turbine blade structure in which an upper and lower platform are spaced apart by a cavity. Although it is noted that cooling air flows into the cavity from the rotor side of the blade through multiple holes
15 in the lower platform, each cooling channel (64,65) only includes one entrance (64a, 64b) through which cooling air enters the front of the cooling channel. (See column 8, lines 43-65).

In contrast, the invention of amended Claims 1, 7, and 8 includes a "plurality of longitudinally-spaced cooling holes extending between the hollow shank portion and the second cooling channel, wherein the cooling holes are oriented substantially transverse to the second
20 cooling channel and adapted to admit impingement cooling fluid into at least a portion of said cooling channel." With this arrangement, the Applicant's invention advantageously provides impingement cooling to the portion of the platform from which the airfoil portion extends.

In contrast, the Fukue cooling channels (64,65) provide only convective cooling to the portion of the platform from which the airfoil portion extends; Fukue does not
25 teach or suggest plurality of longitudinally-spaced cooling holes adapted to admit

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impingement cooling fluid into at least a portion of said cooling channel as is claimed in the present invention. In view of the above, independent claims 1, 7, and 8 are patentable; the Applicant, therefore, respectfully requests the Examiner to withdraw the Section 102 rejection.

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Response To Rejections Under Section 103:

Claims 2-4 and 16

Claim 2-4, and 6 stand rejected under 35 U.S.C. § 103(a), the Examiner contending that these claims are obvious over Fukue in view of U.S. Patent No. 2,656,147 to Brownhill et al. 10 ("Brownhill"). The Examiner apparently reads Fukue as disclosing the claimed invention except for cooling channels which are substantially oval shaped, oblong shaped, or have rounded corners, as disclosed by Brownhill, and believes that it would have been obvious to combine Fukue with Brownhill.

The cited references, however, alone or in combination, do not teach or suggest 15 the claimed invention. For example, as noted above, Fukue merely discloses a cooled gas turbine blade having upper and lower platforms spaced apart by a cavity in which cooling air enters the front of cooling channels (64,65) through one entrance (64a, 64b). Brownhill is directed at cooling gas turbine rotors and includes serrated stub recesses 39a and 39b which cooperatively form channel 39. While it is noted that channel 39 is shown to be 20 oblong, the channel formed by the Brownhill recesses is circumferentially oriented and does not include plurality of longitudinally-spaced cooling holes adapted to admit impingement cooling fluid into at least a portion of said cooling channel.

Even if combined as suggested by the Examiner, the proposed combination would disclose a cooled gas turbine blade having upper and lower platforms spaced apart by a cavity

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in which cooling air enters the front of cooling channels (64,65) through one entrance (64a, 64b) and a circumferentially-oriented channel cooperatively formed by serrated stub recesses. Such a combination still would not teach or suggest a turbine blade having a cooling channel having a "plurality of longitudinally-spaced" cooling holes extending between the hollow shank
5 portion and the second cooling channel, wherein the cooling holes are oriented substantially transverse to the second cooling channel and adapted to admit impingement cooling fluid into at least a portion of said cooling channel" as is claimed in the amended claims.

In view of the above, it is respectfully submitted that claims 2-4, and 6 are patentable. Reconsideration and withdrawal of the Section 103 rejection is respectfully requested.

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Claims 5 and 6

Claims 5 and 6 stand rejected under 35 U.S.C. § 103(a), the Examiner contending that these claims are obvious over Fukue in view of U.S. Patent No. 6,210,111 to Liang ("Liang"). The Examiner apparently reads Fukue as disclosing the claimed invention except for cooling
15 channels that include upper and lower walls that are substantially flat and parallel, as disclosed by Liang, and believes that it would have been obvious to combine Fukue with Liang.

The cited references, however, alone or in combination, do not teach or suggest the claimed invention. For example, as noted above, Fukue merely discloses a cooled gas turbine blade having upper and lower platforms spaced apart by a cavity in which cooling air enters the
20 front of cooling channels (64,65) through one entrance (64a, 64b). Liang is a cooled blade platform having a cooling channel that is substantially flat and parallel. However, the Liang cooling channel extends from the pressure side to the suction side of the airfoil, not from the leading edge to the trailing edge. Additionally, the Liang cooling channel is fed through slots in the platform side edges, not through cooling holes arranged transverse to the cooling channel.

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Even if combined as suggested by the Examiner, the proposed combination would disclose a cooled gas turbine blade having upper and lower platforms spaced apart by a cavity in which cooling air enters the front of cooling channels (64,65) through one entrance (64a, 64b) and a cooling channel extending from the pressure side to the suction side of the airfoil fed
5 through slots in the platform side edges. Such a combination still would not teach or suggest a turbine blade having a cooling channel having a "plurality of longitudinally-spaced cooling holes extending between the hollow shank portion and the second cooling channel, wherein the cooling holes are oriented substantially transverse to the second cooling channel and adapted to admit impingement cooling fluid into at least a portion of said cooling channel" as is claimed
10 in the amended claims.

In view of the above, it is respectfully submitted that claims 5 and 6 are patentable.

Reconsideration and withdrawal of the Section 103 rejection is respectfully requested.

Request For Allowance Of Claims 9-15:

15 In the Office Action, the Examiner indicated that claims 9-15 contained patentable subject matter and would be allowed if rewritten to include the limitations of the base claims and any intervening claims. Claim 9 has been rewritten as an independent claim to include the limitations of original claim 1. In view of the amendments to claim 9, Applicants respectfully submits that claim 9, as well as claims 10-15 which depend therefrom, are in condition for
20 allowance and request allowance of claims 9-15.

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CONCLUSION

For the foregoing reasons, it is respectfully submitted that the objections and rejections set forth in the outstanding Office Action are inapplicable to the present claims and specification. Accordingly, the Applicant respectfully requests that the Examiner reconsider the
5 objections and rejections and timely pass the application to allowance.

The undersigned has made a good faith effort to respond to all of the objections and rejections in the application and to place the claims in condition for allowance. Should the Examiner have any questions concerning this paper or application, or if any undeveloped issues or questions remain, the Examiner is respectfully requested to contact Applicant's undersigned
10 attorney to resolve such issue or question. All correspondence should continue to be directed to our below-listed address.

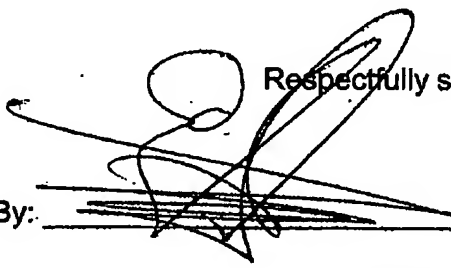
Please grant any extensions of time required to enter this paper. The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

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Dated:

4/4/05

By:

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